

WHAT IS CLAIMED IS:

1. An encryption apparatus using a modulated delay time feedback chaotic system, comprising:

5 chaotic signal generating means for generating a high-dimensional chaotic signal in response to an original chaotic signal and a predetermined feedback chaotic signal;

 delay time modulating means for delaying the high-dimensional chaotic signal output from the chaotic signal
10 generating means by a predetermined time and modulating the time-delayed chaotic signal; and

 feedback means for receiving the chaotic signal output from the chaotic signal generating means and the modulated time-delayed signal output from the delay time modulating
15 means, performing addition and subtraction operations with respect to the received signals, and feeding the operated result back to the chaotic signal generating means.

2. The encryption system according to claim 1, wherein
20 the feedback means comprises:

 a subtracter for receiving the original chaotic signal output from the chaotic signal generating means and the modulated time-delayed signal output from the delay time modulating means and obtaining a difference between the
25 received signals;

a scaling means for scaling a magnitude of the difference signal output from the subtracter to correspond to synchronization conditions; and

an adder for adding a signal output from the scaling means and the original chaotic signal output from the chaotic signal generating means to generate a predetermined chaotic signal, and feeding the chaotic signal back to the chaotic signal generating means.

10 3. The encryption system according to claim 1, wherein the modulating means is operated so that a delay time of the chaotic signal is modulated to a periodic signal, a semi-periodic signal, a chaotic signal or a random noise signal.

15 4. The encryption system according to claim 3, wherein the modulation is performed so that the delay time is modulated to the chaotic signal using a variable of a chaotic system thereof.

20 5. The encryption system according to claim 3, wherein the feedback means is operated so that, when the modulated time-delayed signal is fed back, the modulated time-delayed signal is fed back to a variable, a coefficient or an external force.

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6. The encryption system according to claim 5, wherein the feedback is performed in such a way that a difference between the original chaotic signal and the modulated time-delayed signal is obtained by a subtracter, and the subtracted
5 result is fed back to a variable, a coefficient or an external force by scaling means.

7. The encryption system according to claim 5, wherein the feedback is performed in such a way that the modulated
10 time-delayed signal is directly fed back to a variable, a coefficient or an external force without change.

8. An encryption and communication apparatus using a modulated delay time feedback chaotic system, comprising:
15 an encryption apparatus including first chaotic signal generating means for generating a high-dimensional chaotic signal in response to a predetermined feedback chaotic signal, delay time modulating means for delaying the chaotic signal output from the first chaotic signal generating means by a
20 predetermined time and modulating the time-delayed chaotic signal to generate a high-dimensional encryption signal, feedback means for receiving the chaotic signal output from the first chaotic signal generating means and the modulated time-delayed chaotic signal output from the delay time
25 modulating means, performing addition and subtraction

operations with respect to the two received signals and feeding the operated result back to the first chaotic signal generating means, encryption means for receiving the high-dimensional encryption signal output from the delay time
5 modulating means and an externally-applied information signal and adding the two signals to realize encryption, and transmitting means for transmitting a signal output from the encryption means as a wireless or wired signal; and

a decryption apparatus including an receiving means for
10 receiving the encryption signal from the transmitting means of the encryption apparatus, second chaotic signal generating means for generating a high-dimensional chaotic signal in response to a predetermined feedback chaotic signal, feedback means for receiving the encryption signal output from the
15 receiving means and the chaotic signal output from the second chaotic signal generating means, performing addition and subtraction operations with respect to the two received signals and feeding the operated result back to the second chaotic signal generating means, delay time modulating means
20 for receiving the chaotic signal output from the second chaotic signal generating means and modulating a delay time of the chaotic signal, and decryption means for performing a subtraction operation on the modulated time-delayed signal output from the delay time modulating means and the encryption
25 signal output from the receiving means to realize decryption.

9. The encryption and communication apparatus according to claim 8, wherein the feedback means of the encryption apparatus includes:

5 a subtracter for receiving the original chaotic signal output from the first chaotic signal generating means and the modulated time-delayed chaotic signal output from the delay time modulating means and obtaining a difference between the two received signals;

10 scaling means for scaling a magnitude of the difference signal output from the subtracter to correspond to synchronization conditions; and

 an adder for adding a signal output from the scaling means and the original chaotic signal output from the first
15 chaotic signal generating means to generate a predetermined chaotic signal and feeding the chaotic signal back to the first chaotic signal generating means.

10. The encryption and communication apparatus according
20 to claim 8, wherein the encryption means of the encryption apparatus is an adder.

11. The encryption and communication apparatus according to claim 8, wherein the feedback means of the decryption
25 apparatus includes:

a subtracter for receiving the original chaotic signal output from the second chaotic signal generating means and the encryption signal output from the receiving means and obtaining a difference between the received signals;

5 scaling means for scaling a magnitude of the difference signal output from the subtracter to correspond to synchronization conditions; and

an adder for adding a signal output from the scaling means and the original chaotic signal output from the second
10 chaotic signal generating means to generate a predetermined chaotic signal and feeding the chaotic signal back to the second chaotic signal generating means.

12. The encryption and communication apparatus according
15 to claim 8, wherein the decryption means of the decryption apparatus is a subtracter.

13. The encryption and communication apparatus according to claim 8, wherein the first and second chaotic signal
20 generating means are synchronized so as to decrypt the encryption signal.

14. An encryption and communication method using a modulated delay time feedback chaotic system, comprising the
25 steps of:

generating a chaotic signal by a chaotic system in which variables are functionally connected and a delay time is modulated;

encrypting an externally-applied information signal by
5 adding the information signal to the chaotic signal, the delay time of which is modulated, thus generating an encryption signal;

transmitting the encryption signal;

receiving the encryption signal and feeding the
10 encryption signal to a predetermined chaotic system;

receiving the chaotic signal output from the chaotic system and modulating a delay time of the chaotic signal; and

comparing the modulated time-delayed chaotic signal to the received encryption signal and then extracting the
15 information signal, thus decrypting the encryption signal.